Abstract of the Disclosure

A wind power generation system capable of outputting a generated power at high efficiency and smoothing output power includes a wind power generator and a laser aerovane mounted on the wind power generator or arranged near the wind power generator. Direction and velocity of a wind blowing toward the wind power generator are observed in advance using the laser aerovane, and a yaw angle and/or a pitch angle of the wind power generator is predicted and controlled based on the observation results. Thus high-efficiency operation control of the wind power generation system including the wind power generator is carried out. An output-smoothing device connected to the wind power generator is arranged to predict and control electric power input/output amount of the output-smoothing device based on a predicted output value of the wind power generator and smooth output of the whole wind power generation system.